

1 What is claimed is:

2 1. A packaged dry blended cementitious matrix composition for use
3 in mixing with predetermined amounts of a decorative aggregate and
4 water for producing a decorative aggregate-containing cementitious
5 slurry for pouring, troweling and curing on a base, and for
6 producing a durable decorative aggregate-containing surface bonded
7 to the base, the packaged dry blended cementitious matrix
8 composition being free of additives selected from the group
9 consisting of gypsum, limestone, reactive resins and hardeners
10 therefor, epoxy and mixtures thereof, the packaged dry blended
11 cementitious matrix composition not requiring curing at an elevated
12 temperature, the packaged dry blended cementitious matrix
13 composition comprising:

14 (a) a quartzitic silica blend;

15 (b) a hydraulic cement selected from the group consisting of
16 Type V hydraulic cement and white portland cement;

17 (c) a particulate material selected from the group consisting
18 of fly ash, silica fume and mixtures thereof;

19 (d) optionally, a superplasticizer; and

20 (e) an optional substance selected from the group consisting
21 of shrinkage reducers, alkali-silica reactivity controllers,
22 colorants, permeability reducers and mixtures thereof, and

23 wherein an amount of the quartzitic silica blend is between
24 about 50% to about 79% of the packaged dry blended cementitious
25 matrix composition,

1 wherein an amount of the hydraulic cement is between about 20%
2 to about 35% of the packaged dry blended cementitious matrix
3 composition,

4 wherein an amount of the fly ash if present does not exceed
5 about 8% of the packaged dry blended cementitious matrix
6 composition, and

7 wherein an amount of the silica fume if present does not
8 exceed about 5% of the packaged dry blended cementitious matrix
9 composition.

10 2. A packaged dry blended cementitious matrix composition for use
11 in mixing with predetermined amounts of a decorative aggregate and
12 water for producing a decorative aggregate-containing cementitious
13 slurry for pouring, troweling and curing on a base, and for
14 producing a durable decorative aggregate-containing surface bonded
15 to the base, the packaged dry blended cementitious matrix
16 composition consisting essentially of:

- 17 (a) a quartzitic silica blend;
18 (b) a hydraulic cement selected from the group consisting of
19 Type V hydraulic cement and white portland cement;
20 (c) a particulate material selected from the group consisting
21 of fly ash, silica fume and mixtures thereof;
22 (d) optionally, a superplasticizer; and
23 (e) an optional substance selected from the group consisting
24 of shrinkage reducers, alkali-silica reactivity controllers,
25 colorants, permeability reducers and mixtures thereof, and

1 wherein an amount of the quartzitic silica blend is between
2 about 50% to about 79% of the packaged dry blended cementitious
3 matrix composition,

4 wherein an amount of the hydraulic cement is between about 20%
5 to about 35% of the packaged dry blended cementitious matrix
6 composition,

7 wherein an amount of the fly ash if present does not exceed
8 about 8% of the packaged dry blended cementitious matrix
9 composition, and

10 wherein an amount of the silica fume if present does not
11 exceed about 5% of the packaged dry blended cementitious matrix
12 composition.

13 3. The packaged dry blended cementitious matrix composition of
14 claim 2, wherein

15 the quartzitic silica blend is between about 55% and
16 about 75% of the packaged dry blended cementitious matrix
17 composition,

18 the hydraulic cement is between about 22% and about 33%
19 of the packaged dry blended cementitious matrix composition,

20 the fly ash does not exceed about 7% of the packaged dry
21 blended cementitious matrix composition, and

22 the silica fume does not exceed about 4% of the packaged
23 dry blended cementitious matrix composition.

- 1 4. The packaged dry blended cementitious matrix composition of
2 claim 2, wherein
3 the quartzitic silica blend is between about 60% and
4 about 70% of the packaged dry blended cementitious matrix
5 composition,
6 the hydraulic cement is between about 25% and about 32%
7 of the packaged dry blended cementitious matrix composition,
8 the fly ash is at least about 5% of the packaged dry
9 blended cementitious matrix composition, and
10 the silica fume does not exceed about 3.5% of the
11 packaged dry blended cementitious matrix composition.
- 12 5. The packaged dry blended cementitious matrix composition of
13 claim 2, wherein the quartzitic silica blend is at least about
14 55% of the packaged dry blended cementitious matrix
15 composition.
- 16 6. The packaged dry blended cementitious matrix composition of
17 claim 2, wherein the quartzitic silica blend is no greater
18 than about 75% of the packaged dry blended cementitious matrix
19 composition.

1 7. The packaged dry blended cementitious matrix composition of
2 claim 2, wherein the blended quartzitic silica that when
3 characterized using Standard Sieve Sizes 4, 8, 16, 30, 50 and
4 100 has a particle size of:

5 about 0% larger than Standard Sieve Size 4,

6 between about 4% and about 8% smaller than Standard
7 Sieve Size 4 and larger than Standard Sieve Size 8,

8 between about 17% and about 25% smaller than
9 Standard Sieve Size 8 and larger than Standard Sieve Size
10 16,

11 between about 16% and about 25% smaller than
12 Standard Sieve Size 16 and larger than Standard Sieve
13 Size 30,

14 between about 20% and about 25% smaller than
15 Standard Sieve Size 30 and larger than Standard Sieve
16 Size 50,

17 between about 14% and about 19% smaller than
18 Standard Sieve Size 50 and larger than Standard Sieve
19 Size 100, and

20 no more than about 7% smaller than Standard Sieve
21 Size 200.

22 8. The packaged dry blended cementitious matrix composition of
23 claim 2, wherein the blended quartzitic silica is produced
24 from Sand Size Nos. 16, 20, 30 and 60 has a particle size of

about 25% Sand Size No. 16, about 37% Sand Size No. 20,
about 25% Sand Size No. 30, and about 13% Sand Size No. 60.

9. The packaged dry blended cementitious matrix composition of claim 2, wherein the blended quartzitic silica that when characterized using Standard Sieve Sizes 4, 8, 16, 30, 50 and 100 has a fineness modulus of about 2.5.

10. The packaged dry blended cementitious matrix composition of claim 2, wherein the blended quartzitic silica has a silica content of at least about 80%.

11. The packaged dry blended cementitious matrix composition of claim 2, wherein the hydraulic cement is at least about 22% of the packaged dry blended cementitious matrix composition.

12. The packaged dry blended cementitious matrix composition of claim 2, wherein the hydraulic cement is no greater than about 33% of the packaged dry blended cementitious matrix composition.

13. The packaged dry blended cementitious matrix composition of claim 2, wherein the hydraulic cement is Type V portland cement.

- 1 14. The packaged dry blended cementitious matrix composition of
2 claim 2, wherein the hydraulic cement is white portland
3 cement.
- 4 15. The packaged dry blended cementitious matrix composition of
5 claim 2, wherein the packaged dry blended cementitious matrix
6 composition contains fly ash and the fly ash is no greater
7 than about 8% of the packaged dry blended cementitious matrix
8 composition.
- 9 16. The packaged dry blended cementitious matrix composition of
10 claim 2, wherein the packaged dry blended cementitious matrix
11 composition contains fly ash and the fly ash is at least about
12 5% of the packaged dry blended cementitious matrix
13 composition.
- 14 17. The packaged dry blended cementitious matrix composition of
15 claim 2, wherein the packaged dry blended cementitious matrix
16 composition contains fly ash and the fly ash is between about
17 5% and about 7% of the packaged dry blended cementitious
18 matrix composition.
- 19 18. The packaged dry blended cementitious matrix composition of
20 claim 2, wherein silica fume is at least about 0.5% of the
21 packaged dry blended cementitious matrix composition.

1 19. The packaged dry blended cementitious matrix composition of
2 claim 2, wherein the silica fume is no greater than about 4%
3 of the packaged dry blended cementitious matrix composition.

4 20. The packaged dry blended cementitious matrix composition of
5 claim 2, wherein the packaged dry blended cementitious matrix
6 composition contains silica fume and the silica fume is
7 between about 1% to about 5% of the packaged dry blended
8 cementitious matrix composition.

9 21. The packaged dry blended cementitious matrix composition of
10 claim 2, wherein the packaged dry blended cementitious matrix
11 composition contains superplasticizer and the superplasticizer
12 is up to about 3% of the packaged dry blended cementitious
13 matrix composition.

14 22. The packaged dry blended cementitious matrix composition of
15 claim 2, wherein the packaged dry blended cementitious matrix
16 composition contains superplasticizer and the superplasticizer
17 is between about 0.3% and about 1.5% of the packaged dry
18 blended cementitious matrix composition.

19 23. The packaged dry blended cementitious matrix composition of
20 claim 2, wherein the superplasticizer is a packaged dry solid
21 superplasticizer.

1 24. A packaged dry blended cementitious matrix composition
2 consisting of:

- 3 (a) a quartzitic silica blend;
4 (b) a hydraulic cement selected from the group consisting of
5 Type V hydraulic cement and white portland cement;
6 (c) a particulate material selected from the group consisting
7 of fly ash, silica fume and mixtures thereof;
8 (d) optionally, a superplasticizer; and
9 (e) an optional substance selected from the group consisting
10 of shrinkage reducers, alkali-silica reactivity controllers,
11 colorants, permeability reducers and mixtures thereof,

12 wherein an amount of the quartzitic silica blend is between
13 about 50% to about 79% of the packaged dry blended cementitious
14 matrix composition,

15 wherein an amount of the hydraulic cement is between about 20%
16 to about 35% of the packaged dry blended cementitious matrix
17 composition,

18 wherein an amount of the fly ash if present does not exceed
19 about 8% of the packaged dry blended cementitious matrix
20 composition, and

21 wherein an amount of the silica fume if present does not
22 exceed about 5% of the packaged dry blended cementitious matrix
23 composition.

1 25. A decorative aggregate-containing cementitious slurry for use
2 in producing a decorative aggregate-containing surface, the
3 decorative aggregate-containing cementitious slurry comprising:

4 (a) a packaged dry blended cementitious matrix composition
5 consisting essentially of:

6 (i) a quartzitic silica blend;

7 (ii) a hydraulic cement selected from the group
8 consisting of Type V hydraulic cement and white
9 portland cement;

10 (iii) a particulate material selected from the group
11 consisting of fly ash, silica fume and mixtures
12 thereof;

13 (iv) optionally, a superplasticizer; and

14 (v) an optional substance selected from the group
15 consisting of shrinkage reducers, alkali-silica
16 reactivity controllers, colorants, permeability
17 reducers and mixtures thereof, and

18 wherein an amount of the quartzitic silica blend is
19 between about 50% to about 79% of the packaged dry blended
20 cementitious matrix composition,

21 wherein an amount of the hydraulic cement is between
22 about 20% to about 35% of the packaged dry blended
23 cementitious matrix composition,

24 wherein an amount of the fly ash if present does not
25 exceed about 8% of the packaged dry blended cementitious
26 matrix composition, and

wherein an amount of the silica fume if present does not exceed about 5% of the packaged dry blended cementitious matrix composition;

(b) a decorative aggregate wherein the weight ratio of decorative aggregate to packaged dry blended cementitious matrix composition is between about 20/60 to about 50/60; and

(c) water in an amount that when mixed with the packaged dry blended cementitious matrix composition and the decorative aggregate produces slurry having a slump of at least about 2 inches.

26. The decorative aggregate-containing cementitious slurry of claim 25, wherein the weight ratio of decorative aggregate to packaged dry blended cementitious matrix composition is between about 35/60 to about 45/60.

27. The decorative aggregate-containing cementitious slurry of claim 25, wherein the weight ratio of decorative aggregate to packaged dry blended cementitious matrix composition is about 40/60.

28. A decorative aggregate-containing cementitious slurry of claim 25, wherein the amount of water produces slurry having a slump of at least about 3 inches.

29. A decorative aggregate-containing cementitious slurry of claim 25, wherein the amount of water produces slurry having a slump of from about 3 inches to about 5 inches.

30. A decorative aggregate-containing cementitious slurry of claim 25, further comprising a superplasticizer.

31. A process for producing a monolithic architectural cementitious structure having a decorative aggregate-containing cementitious surface comprising:

a. forming a freshly poured cementitious base that is free of decorative aggregate;

b. preparing a decorative aggregate-containing cementitious slurry having at least decorative aggregate and cementitious matrix composition operable for forming a monolithic structure when applied to the freshly poured cementitious base and simultaneously cured therewith;

c. pouring an amount of the decorative aggregate-containing cementitious slurry having a slump of at least about 2 inches on the freshly poured cementitious base within a period of time after forming the freshly poured cementitious base, effective for forming a monolithic structure, when simultaneously cured with the freshly poured cementitious base,

1 the amount of the decorative aggregate-containing cementitious
2 slurry producing a decorative aggregate-containing cementitious
3 layer having a thickness operable, when cured, for permanently
4 securing the decorative aggregate therein,

5 at least a portion of the decorative aggregate forming a
6 portion of a surface of the decorative aggregate-containing
7 cementitious layer; and

8 d. simultaneously curing

9 i. the decorative aggregate-containing cementitious slurry
10 poured on the freshly poured cementitious base, with

11 ii. the freshly poured cementitious base,
12 for a period of time effective for producing the monolithic
13 architectural cementitious structure having the decorative
14 aggregate-containing cementitious surface.

15 32. The process of claim 31, wherein the slump is at least about
16 3 inches.

17 33. The process of claim 31, wherein the slump is no greater than
18 about 6 inches.

19 34. The process of claim 31, wherein the slump is no greater than
20 about 5 inches.